The Effectiveness of E-learning Process and Design of E-learning Environments.

By

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Abstract

Theoretical background of the learning researches is important to illustrate the theories and practices which are effective on achieving the educational objectives. The e-learning still needs the studies to respond for inquiries that face expanding and development of this system globally. For example:(a) the disagreements of the researches' findings in e-learning effectiveness on the learning domains achievement (Ruth Clarck, 2007 / Thomas Brus & John Saye and others,2009), (b) looking for defining the e-learning process that attains actual e-learning practices and objectives, (c) necessity to define the formal and constructional characteristics of the e-learning environment.(Thomas deVaney, Nan Adams and Cynthia Elliott, 2008, 165-174).

The present research investigates two main concepts. First, the e-learning process that enables learners to practice and achieve high levels of e-learning objectives. Second, the formal and constructional characteristics of e-learning environment which direct the educators and designers to develop the effectiveness of e-learning environment. Finally, processing these issues can reinforce the challenges that face the e-learning growth, and clarify the differences and debates that surround the outcomes, certificates and accreditation of the e-learning internationally.

Key words: e-learning process (LP) - the theoretic, practical and organic views of (LP) - e- learning environment (LE) - the formal and constructional characteristics of (LE)

Introduction

The latest Technological events are mostly effective on creating the new educational concepts especially which based on generating, using and developing of knowledge. High competences of the Information communication and Technology (ICT) have enabled to improve new theory and practice of knowledge like distance and e-learning; therefore, ICT can transfer the information limited traditional outcomes into knowledge unlimited modern objectives.

E-learning system is a modern learning method encourages to give open opportunities for many learners worldly how need to develop them information and skills. Although founded critical researches results invite to arguments for and against expanding of e-learning systems and institutes; For example, Thomas de Vaney, Nan

Adams and Cynthia Elliott (2008, 165-174) have discussed the missing of quality of e-learning courses versus quantity of student's acceptance in the public and private universities. Others important studies have discovered the weakness of the e-learning approach from a comparative view with the traditional learning methods (Janet Smith, Judy Butler, 2005, 129-140 / Joellen Maples, Susan Groenke and Dan Dunlap, 2005, 108-128).

Depending upon the ambitions present and future of the e-learning method for solving some of recent teaching problems, there are modern studies have investigated new appropriate learning environments, like Patrick Fahy (2005) associated between e- learning process and mind mapping to ensure the importance of visual perception to helps learners for formulating those ideas or understands about e- text, and to enables for analyzing and organizing what they know or what they learn by showing.

So it is necessary for treating of the e-learning concepts to understand the educational background that can be foundation its usage and applications, and will discover how learners should practice the e-learning process significantly, in addition to define what e-learning environment characteristics are necessary. Answering of these questions would be discovering new concepts for helping both educators and designers to develop the specific theory and practice of e-learning.

Problem of the research:

Various educational challenges have drowned attention to considering facing the learning objectives and ambitions. Although e-learning has covered the vast educational needs although it is met by many obstacles in developing and generalizing it worldly. Joellen and others (2005), Kearsley (2000) and Liu (1999) decided that many learning methods like virtual, distance, online and e-learning those form a new phenomenon in education and still making of debating issues. So it is important to consider the e-learning concept in order to discover the suitable and effective e-learning processes and environments.

Moreover, comparative Study findings of Shiang Wang (2008) indicated non-significant differences between outcomes of the online learning and face-to-face learning, especially in some of cognitive and affective outcomes. At the same point, Thomas deVaney, Nan Adams and Cynthia Elliott (2008, 165-174) have discussed the importance of assesses the design of online learning environments to improve quality of e-learning system. Those conclusions are confirming the educational needs to research process, method and environment of e-learning.

So the present research will be treating sequentially both of (a, e-learning process that enables students to actual e-learning practice, (b, and the formal and constructional characteristics of e-learning environment which agree with e-learning process as well as adapt to practice an effective e-learning. Generally; treatments of these main points would be avoidance the critical factors of e-learning outcomes, certificates and accreditation, at the same time respond to rarity and disagreement of the researches findings about the effectiveness of e-learning; Therefore, in short, the present research will be answering of two main questions as following:

1. What is the e-Learning process that enables students to practice of the e-learning successfully? .
2. What are the formal and constructional characteristics of e-learning environment which agree with e-learning process and enable to design an effective e-learning system?

Importance of the research:

E-learning is one of the most important method to attain self and community learning in many places and times globally, not only to develop learning outcomes but also for industry, commerce and economy purposes.

Harmony with modernity of these view, some of recent researches interested in e-learning research: for example, the research' conclusion of John Bransford, Ann Brown and Rondney Cocking (1999, 221-226) which have recommended the importance for undertaking new studies treat main variables of e-learning to develop of e-learning topics and environments.

So the present research firstly focuses on; recognizing of e-learning process base on theoretical, practical and organic views. This would constitute basic information to help educators for planning effective curricula and teaching. Secondly, processing of e-learning formal and constructional characteristics would enable designers to design effective e-learning environments.

Plan of the research:

The present research two main variables. These are e-learning process and designing of e-learning environment. E-learning process implies treating three concepts; theoretical, practical and organic views. While e-learning environment process two branches, those are formal and constructional characteristics. Figure (1) abstracts the plan of research variables and concepts, and illustrates the thought line of the research.

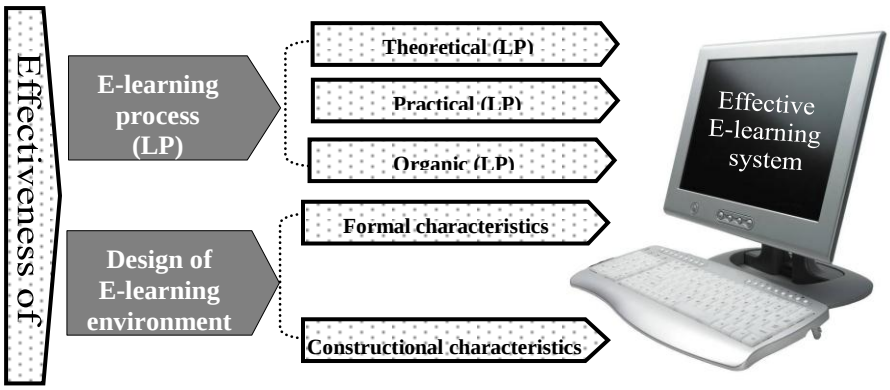

Figure **(1):** A plan of the research variables.

Background Framework of the Research

Practicing is the center of knowledge acquiring from the constructivism view, it enable the learners to invest their skills, abilities and senses in learning activities for gaining the information directly. T goes agree and along with the educational psychology theories which indicate the significant relations between learners' activities and gaining of experiences. So achieving the learning objectives are depending on effective interactions between learners senses with environmental events; therefore, developing of cognitive, psychological and physical human domains in learning situations would promote the educational objectives effectively.

Therefore, e-learning environments designers must support of learning practices in order to encourage the learners for using and producing of knowledge. Nabil Ali (2009, 65-108) confirmed of the knowledge engineering concept which associates between ICT educational approach and engineering in order to accomplish five main tasks of knowledge; these are representative, searching, investing, production and preserving of knowledge.

So, e-learning directs the learners' abilities to use ICT through practice of learning process (LP) and to achieve the high levels of learning objectives. This will strongly face the critics' views that challenge grows of e-learning. So e-learning designers can create ICT programs to build the appropriate e-learning environments that are consist of curricula, teaching and communication, which also aim to stimulate of learners' senses and abilities to best use the LP.

Theoretical, practical and organic views of the learning process

In order to answer the first research question, which aims to know what is the e-learning process that enables students to practice the e-learning successfully? It is

essential to treat theoretical, practical and organic views of the e-learning process, as following:

Theoretical view of e-learning process:

The quality of e-learning process (LP) versus the traditional learning process is depends on high competences of using the information communication and technology (ICT), which invite to mental and manual hyper processing. Variables of ICT reinforce the e-learning content to excite the learners' higher-order thinking that already implied in LP. There are three main phases for using the LP theoretically; these are initial processes (e.g. peruse, reading, checking, and understanding), implementing processes (e.g. Interpreting, applications, manipulating and mental reactions) and evaluation processes (e.g. decision, generalizing, assessing and making judgments).

According to significance of LP there are many researches have looked for defining it's, and tried to discover what these processes are and how to use them effectively to constitute the e-learning environment. Some of those researches classified the LP into integrative and basic science skills, other researches have suggested that LP is teaching processes that learners use during online learning activities (Bridget Arend**,** 2009, 1-23), and others defined the LP according to a problem- solving method that scientists apply to study phenomenon.

Although few researches studied the relationships between the LP and designing of e-learning environment, no one achieved the most effective learning process that suit and agree with the learning environment factors; therefore, the present research tries to study these variables extremely.

The LP can be organized to external and internal perspectives in order to know the brain and senses learners' activities;

Firstly**,** the external perspective illustrates how the learner's senses interact with e-learning environment variables. The observational learning theory for Albert Bandura, 1986 (http://webspace.ship.edu/cgboer/bandura.html) indicated the e-learning process in four concepts formulate the theory of learning by showing, which totally agree with the e-learning activities. These concepts are attention, retention, reproduction and motivation. Bandura's theory concepts can form suitable background of e-learning. When the learner looks at the screen components to construct his intellectual

perspectives, he makes some processes that are: visual concentration, introspection and processing of information through the mental model.

In the book of the theory and practice of online learning, Patrick Fahy (2004, 137-141) indicated that the e-learning process takes place when the learner watches the web page content, and thin selects only a small part of learning content. That includes ones internal response like; thoughts, feelings, and physiologic state. During this mechanism the learner does some of learning process for example; observation, perception, recall, comparison and other acquiring skills which are agree with observational learning theory items. But according to Patrick F., there are similarities with traditional learning activities that associate with face-to-face learning materials, so it is still necessary to know electronic LP definitely, especially when learners interact with e-information. This leads to more inquiry about visual and mental mechanisms, which will be treated in the organic view of learning process as a following point of this research.

Secondly, the internal perspective of LP illuminates the mental activities that the learner practices during e-learning and teaching events that are based on memory system. Depending on the information processing model related with web-based environment, Atkinson & Schffrin (1968) established the linear model of the human memory, which consists of short term and long term memory (in Stephan Carlson and Sue Maxa, 1998, 48-53) those indicated the LP as an information perception mechanism associated with web environment, this implies the brain receives new information through the short term memory as a working memory, then transferred and processed of it in long term memory to store it and retrieve, then backs to the short memory when needing. Ruth Clark (2007) has created form to support the LP understanding in a digital learning environment, and confirm the human memory model when the e-learning process is occurring, figure (2) demonstrates how learner' senses are interacts with e-environment to practice electronic LP.

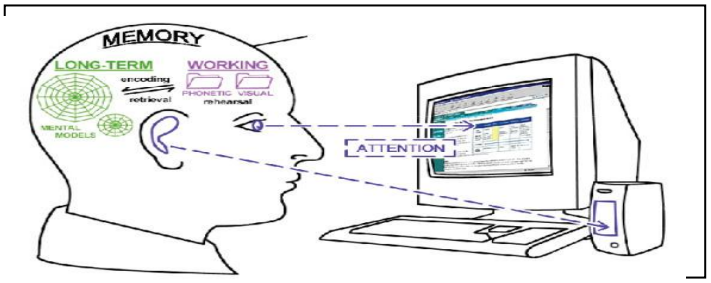

Figure (2): learner' senses interact with e-environment variables.

Therefore, LP implies all mental activities that responsible to receive the e-information to processes inside the memory mechanism, which involve; attention, understanding, processing, encoding and new applications. Mary Chase (2003, 1-12) has affirmed the information processing concept, that pointed the information may only be stored in long-term memory after first being and processing by working memory. She also reinforced the relationships between memory model and visual learning, at the same time she indicated that the Alan Paivio's theory of dual coding (1971) which suggests two cognitive subsystems to attain information in memory, one specialized for objects or events (i.e. imagery), and the other specialized for dealing with language. Therefore, many researches and studies have processed and certain the human memory concept as a main variable in e-learning concept.

Through constructing of the educational theory for online learning, Mohamed Ally (2004, 3-31) confirmed the mechanism of the human memory as a internal information processing where the learner uses different types of memory through the learning. Sensations are received through receptors into the sensory store before processing is occurs, the information persists in the sensory store for less than one second, and if it is not transferred into working memory immediately it will be lost.

Therefore, it is important to use suitable forms of information to make effective mental processing; for instance, simple formulating, pictures, and attractive simulations, which would encourage attention, define, recognize, percept and assimilation of information. Figure (3) suggested an imaging to the human memory mechanism that starts from the information visual perception through eyes into the information processing by long term memory.

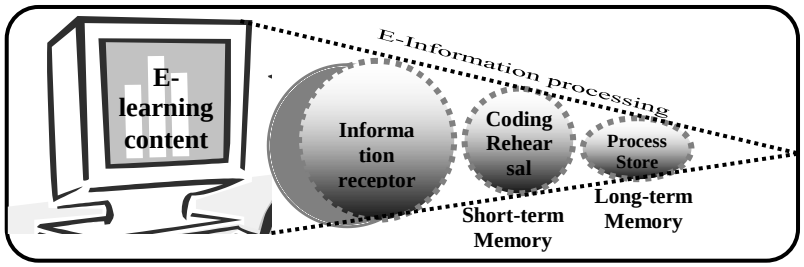

Figure **(3):** Mechanism of the human memory through e-information processing.

Educational Implementing:

Theoretical view of LP directs toward the information processing that start from visual perception to memory mechanism, this invites e-learning designers to consider both continuity, linking and communication relationships through preparing the learning topics, lessons and units. At the same time using graphics and pictures to

facilitate of learning process, and in order to facilitate of information streaming in correct direction. William Horton (2006, 515-525) ensures the significance of visual display when layout of e-learning content according to e-information flexible streaming; for example, foreground-background harmony, texts legibility, screen-focus attention, visually feature content and show only the essential part. These ideas concentrate on effective variables of e-learning content preparation.

According to Bandura' theory (1986) for learning by showing , the designers must interest by disciplining of knowledge when they plan the e-curricula and activities, for instance, considering the organizing, logically and sequencing of the learning content, in order to attain both attention, perception and understanding of information, which help memory activities to discipline and systematic of information. While Mohamed Ally (2004, 3-31) confirms the necessary to allow learners for using the learning materials e.g. virtual laboratory and synthesizing activities that help to transfer the information as date through senses to sensory process and then memory store to take new constructs and meaning of information.

If the learning happens easily when information is similar with the last human experiences according to constructivism and cognitive' theories, it is necessary to connect the new information with the previous learner knowledge, which already process and store in the short and long memory. So the designers can adapt the new curricula with memory context to make high harmony between tow activities. Moreover, they would consider the formal attractive factors to design the learning content e.g. colors, voices, visual texts, and then the manual treatments that excite senses to interact and receive the exhibited information. This would help process and transfer in working and store memory.

Practical view of the e-learning process:

The practical view of e-learning process discusses what the learners' activities are, especially at the same learning moment. Therefore, LP collects between manual and mental activities that learners practice during study and research. It can be classified to two branches, the first are preparatory processes that help learners to start studying; like traditional observation, attention, data checking and board treatments; and the second are manipulations processes those help learners to interact with data on screen in order to attain the study requirements, for example; reading, perception, experimenting and making judgments. Final report of the EU commission (2005, 58:60) discussed the electronic LP during the high school students study by ICT tools

on vocational secondary phase; the report defined hands-on activities, synchronous and\or asynchronous communication and project management skills. In higher education level UNESCO report (2002, 25:27) mentioned the same LP in addition to the concentration on interactions between components of distance learning, especially the communication between teachers and learners during audio/video players or Internet.

Although these two reports affirm the importance of communication as a main process in distance and e-learning systems they also consider social feeling in e-learning community, which agree with nature of e-learning concept that based on contacting between teacher and learners in different places for achieve the educational objectives. While Rob koper (2006, 13-22) describes LP to indicate the processing of the learning materials (e.g. books, articles, software programs, pictures) and services (e.g. forums, chats, wiki's), which used to collaborate and to communicate through teaching-learning operations. Joellen Maples, Susan Groenke and Dan Dunlap (2005) believe that other LP has taken place in e-learning events, for instance, the different kinds of reading the electronic text than traditional prose.

Eventually, nevertheless it seems there are external similarities between traditional LP and electronic LP but there are significant differences in studying, materials, thinking and other learning interactions, which can be illustrated in table (1) with consideration each of the characteristics' subjects, curricula, learning stages and learners' ages.

Table (1): Differences between traditional & e-learning process

Comparison	T-LP	E-LP
Studying and learning materials	Studying Based – on actual material, e.g. books, labs equipments and tools, as limited information resources.	Studying Based –on virtual material, e.g. E-texts, simulations and communication, as unlimited knowledge resources.
Learning activities, thinking and performance	Concentration on reading, understanding and evaluation, with hand reports writing. Depending on logical thinking and manual treatment.	Using observation, perception and data collecting \ recording, with keys board manipulating. According to imaginary and creative thinking with manual proficiency.
Learner\teacher interactions	Directly, through face –to- face teaching, and expanding of dependent emotions.	Hypothetical , during of the communication, with exchange of the instructions and feedback, Dominating of the independent feeling.

Educational Implementing:

Depending on practical understanding of the LP that confirm the importance for studying, thinking and interaction, the e-learning designers have invited to plan both learning curricula and teaching situations in order to motivate the mental and manual learners' activities, to invest both learning content, resources and communication towards the objectives. Which exciting the humanity senses and skills to attain more learning interaction enables to achieve the significance information and experiences.

William Horton(2006, 47-60, 89-90) presents design of e-learning system to reinforce studying, thinking and learning interaction based on practicing of learning materials forms: for example, slide showing, software demonstrations, information films, discussion presentations, and virtual field trips, which adapt to attract the interests to interactive' meditation, questioning, discovering and experimenting. As well as encourage to create interaction levels; e.g. teacher-learner, learner-learner and learner-information resources, which increase the negotiation and social senses between them and enable for achieving the quality and quantity of learning outcomes.

This can be done simultaneously with the individual e-search on internet resources; for example, libraries and scientists' sites, that excite learner to practices e-skills, and also direct to more thinking and acquire related with significant learning experiences.

An organic view of the e- learning process:

Reviewing of the Literature in learning and brain fields obvious rare and few of educational studies that interested in relationships between the learning process and brain operations, in order to understand the electronic LP completely, especially to discover how brain contributes in receiving, assimilating and processing of e-information. This invite to inquire about how learners are learning visually and mentally especially with use LP from organic view? Defiantly, what is the functional role of the brain parts when learners practice the electronic LP?

Bandura theory' concepts (1989, 1175-1184) have indicated the most of the human behavior learned observationally through the information modeling based on visual learning, this reinforces the importance of visible sense to attain of visible visual understanding, at the same time concentrates on the eye role as a portal introduces to learn. Moreover; researches still looking for new learning relationships between brain construction and the information processing to illuminate which brain parts responsible to one or more of e-learning activities?

Recently, some of authors already have presented the learning and brain relations to discover the basic brain functions which related with the same learning activities, for example; both Semir.zeki, Richard S. J. Frackowiak, Karl J. Friston and others (2003) and Tamara van Gog, Janet G.van Hell, (1991) (www.enchantedlearning.com-www.brainhealthandpuzzles.com) indicate there are three human brain parts responsible for information processing based on visual system there are; cerebrum, cerebellum, and the brain stem, definitely there are four lobes in the cerebrum help the visual learning activities are; a-the Frontal Lobe that is responsible to visual problem solving, b-the Occipital Lobe that is responsible for **v**ision and reading, c- the Parietal Lobe that is responsible for some visual functions and d- the Temporal Lobe that is helps visual memories with Some vision pathways.

Therefore, there are significant relations between human brain components and the information attainment process, which starts through vision and directs towards the information processing operations. So there are significant visual cerebrum rolls on information receiving, understanding and analysis. These conclusions reinforce the e-learning concept that based on observe and treat of visible screen data.

Other brain parts are collaborating in visual learning; for instance, the Midbrain helps of visual process and auditory information, the Pons down of temporal lobe helps to connect sensory with motor information, and stimuli reacting for information receipted. Also the medulla oblongata helps to pass sensory information to rest of brain stem.

Figure (4) presents the human brain parts related with the learning process activities. *(www.brainhelthandbuzzles.com\ www.enchantedlearning.com).*

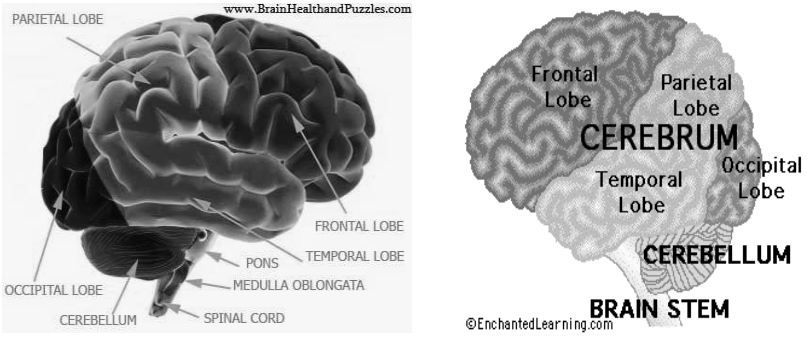

Figure (4): The human brain parts of the e-learning functions

Therefore, brain visual activities are very important in information receiving and processing. Obviously, there are already brain' function that visible, audio and process should consider when prepare e-learning materials and activities.

Justus Plater (2001, 1-3) discuss visual learning feature to affirm the three brain characteristics relate by the learning, those are, a; the human brain devotes enormous computational resources to attain the vision, b; the brain directly involved in visual information processing, c; and the essential visual skills learned and developed in a long process.

In conclusion, first; the brain parts are collaborating in e-information processing mechanism and take especial pattern through the cerebrum. Which launch from visual to intellectual perception. The second; the visible brain' mechanism agree with e-learning requirements which based on visual, mental and manual treatments. These points confirm the present research ideas that study e-learning process and its relationships with e-environment designing.

Educational Implementing:

Each part of the brain has a special role in general cerebral activity, and effectively work together to accomplish the information perception operation; therefore, it is important to prepare multi variables of learning materials; for example, visually, audible and pictured, moreover, simulations; graphic, virtual forms and writing texts. According to the brain ability to process and achieve many forms of information, the educators and designers should utilize from brain mechanism, especially to design the suitable e-learning courses and materials which excite the brain parts and functions to do more and high learning activities, simultaneously with stimulate the learners' skills to perfect performance of e-learning; For example, the educators can select the brain storming and problem solving strategies to encourage the learners for suggesting of creative ideas to solve the phenomenon hypotheses.

The designers can also adapt both formal and constructional characteristics of learning environments in order to reinforce the learners' brain capacities to excite high-order thinking skills in order to achieve significant prospective of learning concepts. William Horton in "e-learning by design" book (2006, 172-175, 177-168, 181-182, 218 and 495-519) has mentioned an importance to consider various activities that agree with brain mechanism to stimulate the learners' thought towards meditation, evaluation, brainstorming, questions and other effective visual display activities. And also consider create e-courses that harmony with visual display

aspects, and then brain functions mechanism. Obviously, most of these activities treat the preparation variables of learning courses and direct to enrich and attract the cerebrum parts to more and effective information processing. In order to more harmony with these discovers, the second part of the present research will treat the formal and constructional of the e-learning environments.

Conclusion of the learning process views:

In conclusion, understanding of theoretic, practical and organic views of LP requires for giving learners more open learning opportunities that concentrate on multi curricula, materials, communication to use both their visual senses, mental treatments and manual manipulating in order to interaction with e-learning content and environment variables. And lead the e-learning educators and designers to formulate the new theory and practice of e-learning that enrich the e-learning content and methods. Eventually, Figure (5) collections the theoretical, practical and organic views of the (LP).

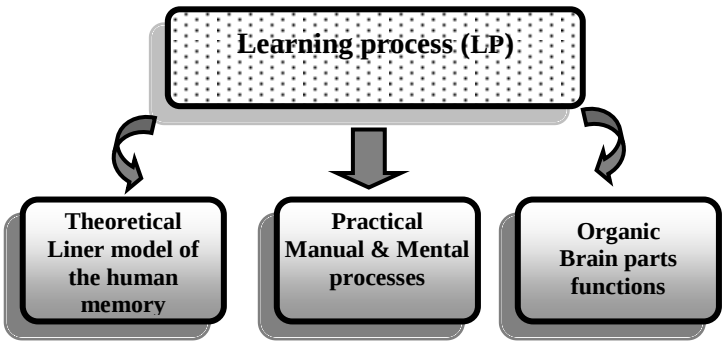

Figure (5): Collecting of the electronic LP views.

Design of the e-learning environments

In order to answer the second research question, which aims to know what are the formal and constructional characteristics of e-learning environment, which agree with e-learning process both formal and constructional characteristics of e-learning environment, as following:

Depending on understanding the learning process in theoretical, practical and organic perspectives it is essential to create the suitable variables to constitute the e-learning environment. Which consider both formal and constructional characteristics, along with focus on an effective interaction between learners and e-learning variables; that means that the important to consider both forms, construct content and contacts of the learning and environment, and demand to determine an effective plan and design

of environments. Shirley Alexander and Tanja Golja (2007, 17-33) have used the e-learning system implied e-environment consisted both of subjects' matters, access of materials, links to web resources, send emails, discussion board, submit assignments electronically and communication, in order to use students' experiences to derive quality in an e-learning system in university of technology in Sydney. This will help to define environmental components and illustrate both humanity and materials resources could interact to build of the e-environment concept.

At recent time, Ingo Blees and Marc Rittberger (2009, 1-18) describe e-learning environment context as a learning portal allow to electronic cooperate between learners and teachers to participate at the same platform and tools. They prepare e-learning units to develop their interest and knowledge. These confirm the importance of online connection on the environment as a main concept to interact during the e-learning events. Therefore, e-learning environment is an electronic organized form that supported by curricula, resources, communication and technology material, and prepare to practice both learning 'activities and persons' interactions. So designing of an e- learning environment can be organized according to collect three main interactive components are;

1. The persons' performances (e.g. roles of teachers, learners, peers, and monitors).
2. The learning' curricula and materials (e.g. manipulating sites, resources, files, graphics and labs).
3. The learning' communications (e.g. interactions with persons, messages, discussions, processes and feedback).

Both learning 'performances, materials and communications are leading interactively toward achievement of e-learning objectives, and already implied to define of e-learning characteristics, which will be treated sequentially. Figure (6) illustrate the interactive components of e-learning environments.

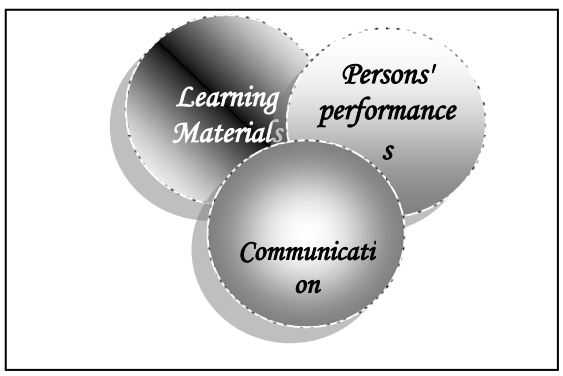

Figure (6): Components of the e-learning environment.

Characteristics of e-learning Environment

Effectiveness of learning styles are depending on educational philosophy that necessary to direct the learning practices toward the learning objectives; Therefore, designing of an e-learning environment must established according to plan both of formal and constructional characteristics.

The formal characteristics are describing the screen icons and forms in order to establish the harmony between environmental components, and then to facilitate both visual perception and receiving simultaneously. While the constructional characteristics are collecting of humans and materials' roles to give interactions 'opportunities to the learners with persons and resources. Both formal and constructional characteristics aim to adapt an e-learning environment to adapt to appropriate and best of LP practicing.

Therefore, the present research concentrates on treating the formal and constructional characteristics of the e-learning environment to help both e-learning educators and designers to work cooperatively to design their environments.

Firstly: the formal characteristics of e-environment:

Design both pages, forms and texts of the e-learning are based on attaining all learning interactions, communications and objectives on the environment. The first step to design environment is selecting a suitable form of the shape and topics to consider realization, harmony and complete perspective of the exhibited data on screen. Concept map is a curricula design method focuses on organizing and collecting all concepts and components in one form, it would be enables learners to show all organized concepts with its interrelations in one scene on the same page, then helps to adapt them to effective beginning in manual, visual and mental activities of exhibited information.

Elizabeth, Brenda. & Michael (2005, 505-513) used concept mapping as a classroom tool to constructs the learning content and illustrates the relationships among complicated concepts. They affirmed that the concept map is important to organize of learning content in a visual framework in order to give better understanding of main ideas with interrelations, and also to know how concepts can be integrated on the same form. These assure the significant correlation relations between texts obvious and mental perception facilitating, at the same time encourage of the brain activities for information organizing and processing.

While Mohamed Ally (2004, 3-31) connected between the memory information map with concept map that helps to show all major and secondary concepts in the topic simultaneously, which must be included in the online learning materials. From the cognition perspective Rop Koper (2006, 13-22) discussed the importance of the conceptual model of e-learning design for description the teaching- learning processes. This means the necessity of the agreement between concepts plan and facilitate of learning process, and also reinforces of harmony between the environment components.

Therefore, designing of e-learning environment using concept map is important for organizing the screen form and learning texts simultaneously in order to improve of visual understanding, and for steaming the information processing in human mental. On the other hand Ingo Blees and Marc Rittberger (2009, 1-18) have confirmed the formal characteristics design of e-environment that should make the individual engagement of each learner visible in a transparent way; this means that the importance of visibility-based design to agree with theoretic of e-learning prospective, and also confirm the information processing visually.

Generally. Figure (7) images the formal characteristics and context of the e-learning environment.

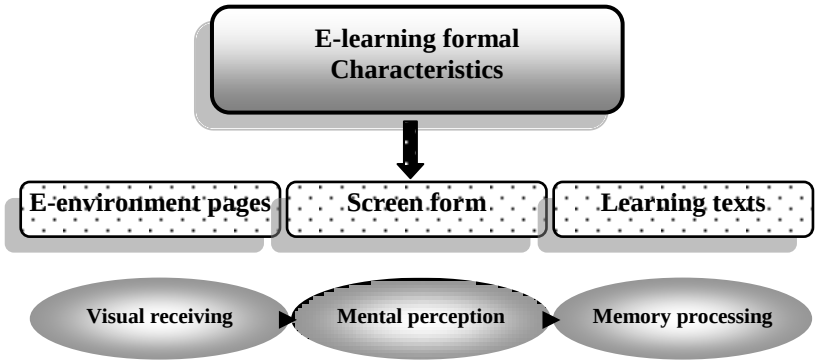

Figure (7): E-learning formal characteristics.

Content of Screen Data:

Organizing of screen data content in e-learning environment indicates consistency and harmony elements that among all items on screen, which consist of the management data (e.g. defining, registration, times, links and contact information), the learning data (e.g. degrees, schools, courses, studying programs and semesters) and the advertising data (e.g. sites, relations, discovering, announcing, conferences, careers, events .etc.).

These elements could attained through the agreement interrelations between organizing, obviousness, and visualizing of items on screen, that adapt to give the learner good impressions and activate receiving towards information. On the other side missing those elements will restrain to make the positive learner impressions, and to disable the streaming information during perception.

In addition to other factors effect on both harmony on screen date and also the learners impressions; for example, screen planning, items form, colors distribution, items size, voices texts, and graphics, which are attracting the learners senses and motivate to attain of information percept, at the same time, help to construct the positive impressions and information processing streaming.

Discipline of Knowledge:

The discipline of knowledge in e-learning content indicates the organizing of information in units, modules, topics and lessons contexts. It can be formulated according to logical hierarchy of information which concentrate on considering the concepts sequencing and content extension. This would be adapt to logical learning and enable to select the suitable teaching methods in addition to agree with information streaming in the correct direction mentally.

While knowledge indicates the e- content, e-content contain writing texts, graphics, and simulations, which organized to guide the learner towards the effective response and feedback. There are other e- content forms like virtual laboratories, projects and programs that organized to excite learner for multi learning interactions. Some content variables utilize in discipline knowledge for improving the teaching and understanding; for example: information enrichment, multi forms of content, obvious exhibits, and inquiring formulations of content as well as interaction capabilities.

In Terry Anderson& Fathi Alloumi 'book "theory and practice of online learning" (2004, 137-141) both Fleming (1987); Mayer (2001) have suggested that the graphics and captions in online course are increasing of learning levels via stimuli the learners focusing with their visual perception; Therefore, enriching of information formulation that associated with systematic of exhibition methods would stimulate both learner cognitive, skills and psycho domains, which amount of the highest performance and complete understanding.

On the other side, the undisciplined information which implied in traditional curricula is constrain the organizing thinking, while missing the attracting factors in learning texts will effect negatively on information streaming. Generally, disappear of

effective variables of formulation leads to inactive learning and traditional streaming of information.

Eventually, e-content designers must attain of discipline knowledge principles when prepare the e-learning curricula and lessons. Those via effective information organizing and formulating in order to push the learner' domains for more interactions, and planning of effective teaching and materials encourage of learner inquire, discover and creative behaviors. So it is important to review the design criteria to effective learning like; learning strategies, educational psychology, curricula designing and learner-centered education approach.

Secondly: the constructional characteristics of e-environment:

The constructional characteristics of e-learning environment are treating the learners and teacher interactive activities which implied learning content, resources, discussions, and communications.

John Bransford, Ann Brown, and Rodney Cocking (1999, 119) studied the effective e-learning environments that based on centered learners, knowledge, assessment and community, this means the importance of teaching interactive between humanity and materials elements, and also affirm the importance to prepare both of learners, teachers and teaching roles. Rob Koper (2006, 13-22) confirms the same meaning that the e- environment design describes the learning process takes place in teaching units (e.g., course, lesson and other learning events). Which consider both learning content and materials. So most e-environment preparing criteria must consider design of e-learning content in order to make a suitable formulating for information. The process of design e-learning content is consists of topics, subjects, lessons, units and books and also consider the utilizing of texts, graphics simulations, movements and virtual effects in order to formulate and develop contemporary of e-learning content.

Ruth Colvin Clark & Richard E. Mayer in a book of "e-learning and the science of instruction" (2003, 90- 102) have indicated that the importance of guidelines for learning multimedia consumers and designers, they have established some bases to design of e-environments; for example, conversational style with virtual coaches, words with graphics, words as audio narration, the learner control versus program control, practice of problem solving skills, training focus on thinking processes and media elements principles.

Obviously, direct these instructions to design of learning texts in order to make effective of e- environment factors, at the same time indicate the interactive between both visual information, learner-centered and media concepts, which already reinforce of e-learning approach at the same time agree with the present research thought.

Depending on the literature has have treat e-learning environments, there are two main classifications of constructional characteristics; the first illustrates the e-learning content and resources, and the second presents the e-learning process and communications, these will be demonstrated in figure (8) and treated during two main departments as following:

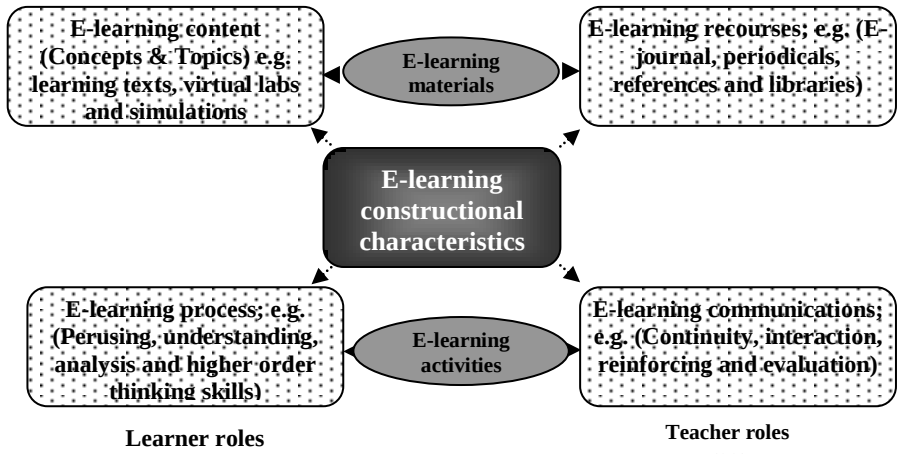

Figure (8): E-learning constructional characteristics

1-E-Learning Content and Resources:

While the traditional study is based on books during face to face teaching and concentrates on limited classroom environment, the e-learning content is based on the learner-investigation with teacher-feedback in open communication. Moreover, E-learning content consists of lessons and teaching activities while e-resources contain electronic journals, periodicals, references and libraries which adapt to practice of learner-teacher interactions. Both e-learning content and resources form the learning data through visible context on internet.

Other information can be gained by free learners' search on the related institutes' sites; Therefore, Michael Wesch (2008a) in reference of (Blees and Rittberger, 2009, 1-18) assume that the information and communication culture changed to new web technologies knowledge culture, they also affirm that the learners would be able to effective acquire of knowledge they require by applying the media they use anyway. Although e-research is important to teach students in open resources to get related

knowledge it is also may raise the learners' experiences or carry too much from the defined learning time.

During development of online course, Dean Caplan (2004, 175-194) affirms importance of e-learning content and resources especially that have multi using in learning events; for example, modern e-texts on a web site, delivered texts either distributed by internet setting or by mailed hard copy and easy e-searching as well as texts manipulating; Therefore, there are content criteria items can be effected on teaching and learning processes; for example, up-to-date information, objectivity, teaching, enrichment content, multi resources and disciplining of knowledge. These would attract the learners to invest them multi senses and e-search skills through practice of learning process activities lengthy.

Interaction of e-content:

The learning interactions form a central concept in e-learning method, along with the especial variables and challenges like quality, distance, indirection and individuality. The learners and teachers' activities must be designed based on multi interactions in order to allow to inquiries, discussions, feedbacks and evaluate of information; therefore, e-learning content constitute of main data to all manual and mental learner's activities.

According to focusing of e-content in interactive e-learning environment, both Klan, Abang, Ming (2003, 45-51), Terry Anderson (2004,) and Gamal S. Ahmed (2007, 1- 45) describe that the enrichment of e-learning content invites to effective learning interaction between learners and teachers. Significance of e- content characteristics are refers to first-hand resources, new knowledge, global information and social presence.

M. Ally agree with Bonk and Reynolds (1997) in confirming that the online learning courses are necessity to create higher- order activities that enable learners to link with new information to effective acquiring of meaningful knowledge. Therefore, M. Ally has formulated new e-content characteristics; for instance, interacting, accessing, supporting, acquiring and enabling. Which harmony with important teaching factors; for example; investigation, experiments and open ended questioning. All of these are agree and encourage to practice of e- learning process.

Although the importance of e-content forms in design of learning texts that organized via texts, labs, graphics and other web-based sources it is also important to select of teaching methods with considering the following points:

1. Nature of the e-content in its interrelations with the differences between the subjects, topics and lessons.
2. Importance to invest the learners-teacher cognitive styles and attain an effective psychological agreement between them.
3. Learning methods which used in the original discovery of each subject or science, that necessity use when teaching of these subjects or sciences.
4. Multi levels of learning interactions; for example, teacher\learner, learner \ content and learner \ learner in the learning environment.

2-E-Learning Processes and Communications:

Achievement of the meaningful e-learning is depending on considering both processes and communications activities, which are happen between humanity and materials learning components in learning situations and events, that are important especially with its interrelations with contemporary e-learning challenges, those related with both indirection, distance, asynchronous as well as virtual elements. While e-learning processes are happening through peruse, understanding, experimenting and implementing as well as all performance activities that are form the study requirements, the learning communications indicate the teacher' feedbacks, continuity, discussion and evaluation, which perform to guide and manage of learners through contacts of e-teaching; therefore, e-learning processes and communication can be treated as the following points.

A-E-learning processes:

There are three main components to practice of e-learning processes are; teacher, learners and courses (content). Although e-content criteria are significant to objectives. Moreover, also e- content nature is important in choosing the appropriate teaching method, which help to planning of mental and manual activities that can be exercised by learners during the study. The learner starts study with inquiry activities, for example, text preliminary reading, understanding the requirements then learning performances and evaluate of learning results. Those activities have accomplished before sending any conclusion into the teacher. Teacher interests to support the learning' stages and provides by learning needs; for example, illustrate the course objectives, tasks, assignments, requirements and presents the feedback continuity. New role of teacher also implied to provide the end examines to check the learning outcomes then makes of evaluation judgments in addition to distribute the especial feedback, homework and over activities.

Some tools and activities are using to carrying out of e-learning processes; for example, e-mail and chatting as well as synchronous with asynchronous contacts. In the first chapter of the present research more details theoretical, practical and organic views of the e-learning process that are practiced by the learners with e-learning content.

B-E-learning communications:

During the learning situations some of the communications have practiced to associate e-learning components; learners, teacher, colleagues, experts, scientists and scientific sites. Communications completed via internet technology based on synchronous and asynchronous communication. Dean Caplan (2004, 175-194) indicate the connecting patterns which became known as learning objects including both text, electronic mail, discussion boards, chat utilities, voice over Internet protocol, instant messaging and synchronous audio, in addition video clips, interactive activities, simulations, games, as well as self-grading exercises, quizzes, examinations; and Web sites

The communication can be classified into two main departments; the first is educational communication, which help to guide the learners for studying events; like, communication between teacher and learners in order to sending of study' requirements like course, instructions, activities and checking the assignments. These along with the communication between the learners and partners in addition link with scientists, experts or scientific sites. While the second department is the motivated communications which reinforce learners to excellent performance with the learning events and elements, and to create participation and stimulate factors toward the study. Moreover; to built confidence and exchange of truth with them selves and their teacher.

Ingo Blees and Marc Rittberger (2009, 1-18) discuss the teachers' roles in the e-learning environmental, which show their presence in the learning environment, like deliver resources, make contributions and suggestions; for instance, by participating in discussions, monitoring, feedback and evaluation.

In the experimental research of Shiang Wang (2008, 59-74) presentation of the new e-learning environment based on synchronous communication tool (yahoo messenger) to develop online learners' sense of community and their multimedia authoring skills. These e-activities guide the learners to achieve the online hands-on skills and other manipulating abilities. While both Joellen Maples, Susan Groenke

and Dan Dunlap (2005) study the Students' perceptions of learning community in an online synchronous environment, they present description of the online environment as a virtual classroom focused on importance of synchronous\Asynchronous connections, social\ democratic dimensions and electronic text, that also include animated graphics, video and hyperlinks.

Also Mohamed Ally in the book of "theory and practice of online learning" (2004, 3-31) defines significant online learning communication; for example, using the Internet to access learning materials in order to interact with the content, instructor, and other learners, and to obtain support during search looking for the new related information. he confirms that the asynchronous online learning are enabling the students to access the online materials at any time, while synchronous online learning allow them for real time interaction with instructor.

Conclusion

The present research is tried to find out the effectiveness of E-learning Process and Design of E-learning Environments, in order to achieve some of significance objectives; first, decide the disagreements of the researches' findings in e-learning effectiveness on the learning domains achievement. Second, define theoretical, practical and organic e-learning process. Third, design both formal and constructional characteristics of e-learning environment which direct both educators and designers to develop the effectiveness of e-learning environment.

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